NEW HORIZONS OF STROKE CARE

ROBERT S. FLINT, M.D., Ph.D.

DISCLOSURES

- No financial relationships

- Lecture will include a discussion of unapproved and investigational uses of products and devices

INDIANA EPIDEMIOLOGY

- 7th highest stroke rate in the country
- 15th in mortality from stroke
- 4th leading cause of death
- 2.6% of Indiana population living with sequelae of stroke
- Cost of medical care for stroke in Indiana was $373 million in 2006

STROKE MANAGEMENT

- Prevention
- Acute care
- Rehabilitation

PREVENTION

- Risk factors
- Antiplatelet agents
- Anticoagulation agents
- Carotid intervention

RISK FACTORS

- Tu, JV. Reducing the Global Burden of Stroke: INTERSTROKE. Online Lancet 6/18/10.
- Standardized, case controlled study in 22 countries (only 14% high-income).
- 3000 new strokes vs. 3000 nonstroke age-matched controls.
- Data from history, physical exam, and ancillary testing.
- 90% of stroke risk attributable to 10 risk factors.

RISK FACTORS (CONT.)

- Hypertension
- Smoking
- Waist to hip ratio (highest vs. lowest tertile).
- Dietary risk score (unhealthy CV diet)
- Regular physical activity
- Diabetes mellitus
- Alcohol (>30/month or bingeing)
- Cardiac causes (afib, CAD, valve disease)
- Ratio of apolipoprotien B to A1
- Psychosocial (stress, depression)

ANTIPLATELET AGENT

- Double blind, randomized study comparing 100mg BID cilostazol to 81mg ASA after CVA in Japan.
- 1335 patients in each arm.
- 26% fewer recurrent strokes on cilostazol.
- 50% fewer bleeding complications.
- Cilostazol is known as pletal.

ANTIPLATELET AGENT

- Platelet Inhibition and Patient Outcomes Study (PLATO)
- Assessment of Ticagrelor in acute coronary syndrome vs clopidogrel
- Randomized, blinded study lasting 12 months
- All cause mortality: 9.8% ticagrelor, 11.7% clopidogrel
- CVA : 1.5% ticagrelor, 1.3% clopidogrel
- Slightly higher risk of hemorrhagic CVA with ticagrelor
- Recommendation is not to use this agent in patients with history of CVA or TIA

ANTICOAGULATION AGENT

- Randomized Evaluation of Long-Term Anticoagulant Therapy (RE-LY) trial.
- Double-blinded, randomized comparison of warfarin vs. 110mg dabigatran vs. 150mg dabigatran in patients with nonvalvular atrial fibrillation and prior cerebral ischemia.
- 1200 patients in each arm followed for a median of 2 years.
- No difference in recurrent CVA.
- 73 to 89% relative reduction in intracranial bleeding.
- Dabigatran – fixed dose with no need of coagulation monitoring.

CAROTID INTERVENTION

- Carotid Revascularization Endarterectomy vs. Stenting Trial (CREST).
- Prospective, randomized, controlled study spanning 10 years in U.S. and Canada.
- 1300 symptomatic (50% by angio, 70% by US, >70% by CTA) and 1200 asymptomatic (60% by angio, 70% by US, >80% by CTA) carotid stenoses.
- At 30 days, more CVA after stent, and more MI after CEA.
- Up to 4 years, ipsilateral CVA were same.
- Results same for symptomatic or asymptomatic and for either gender.
- However, under 70 years of age, stent better and surgery better if over 70.

CAROTID INTERVENTION (CONT.)

- International Carotid Stenting Study (ICSS).
- Prospective randomized trial including 1700 symptomatic patients in Europe, Australia, New Zealand, and Canada.
- At 30 days, twice as many CVA after stenting vs. CEA, and equivalent MI (0.5%).
- Included practice lead-in stenting cases, multiple types of stents, less use of distal protection devices

ACUTE CARE

- Intervention
- Imaging
- Telemedicine
- Stroke systems

MECHANICAL THROMBECTOMY

- Merci retrieval system
- Penumbra system
- EKOS ultrasound device

MERCI RETRIEVAL SYSTEM

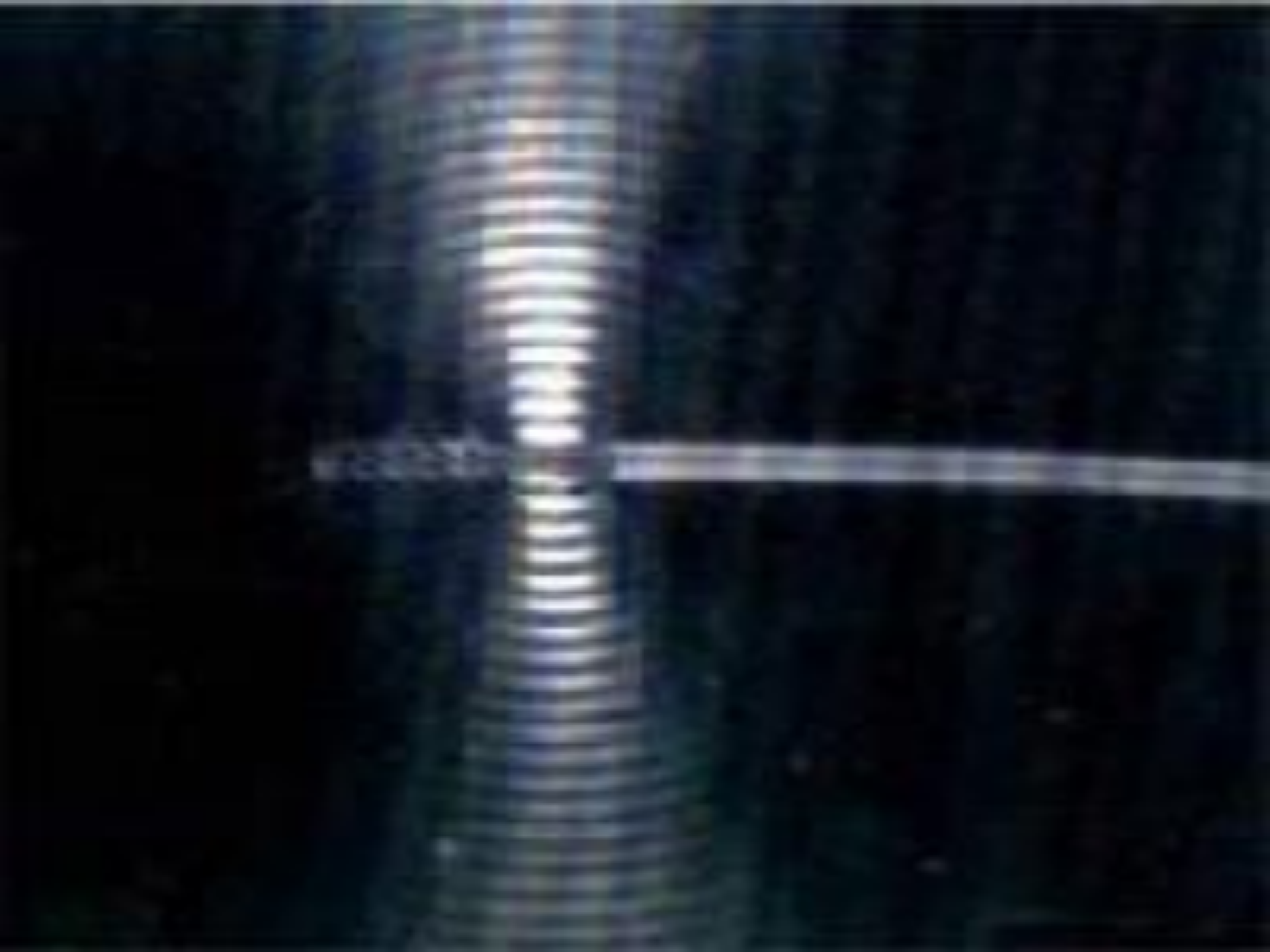
- Use within an 8 hour window
- ICA, proximal MCA, basilar, & vertebral arteries
- Recanalizaton: 50% with device alone, 65% with device and tPA.
- Rankin <2 at 90 days: 32% (49% of those revascularized)
- Symptomatic intracerebral hemorrhage: 9% (with or without tPA)
- Mortality: 39% (2:1 not revascularized: revascularized)

PENUMBRA SYSTEM

- Use within an 8 hour window
- No tPA
- Recanalization: 81%
- Rankin <2 at 90 days: 25% (29% of those revascularized)
- Symptomatic ICH: 11%
- Mortality: 33% (29% if revascularized)

EKOS ULTRASOUND DEVICE

- Combines ultrasound with infusion of a thrombolytic agent
- Anterior and posterior circulation events
- 57% recanalization with an average time of 46 minutes.

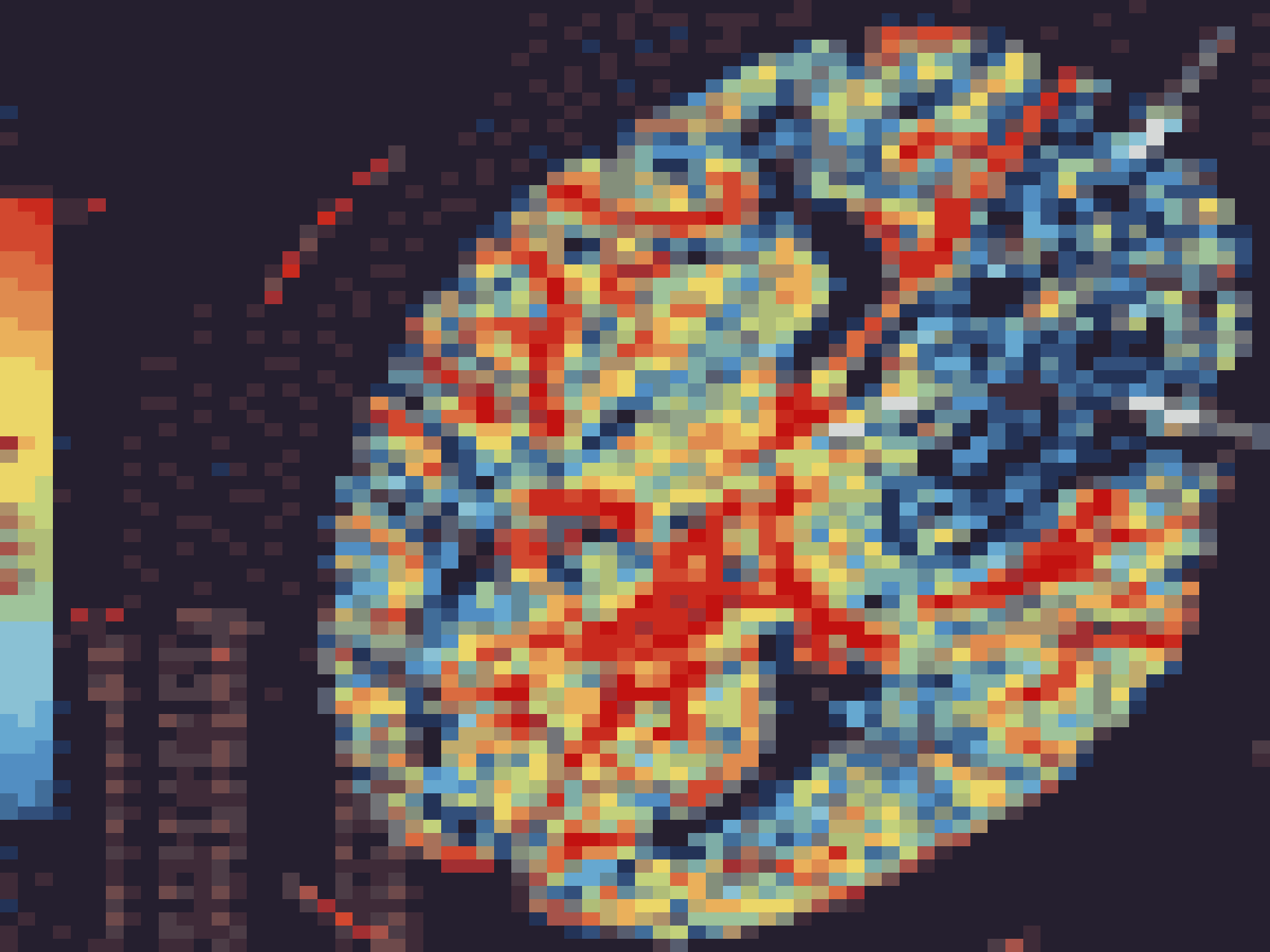


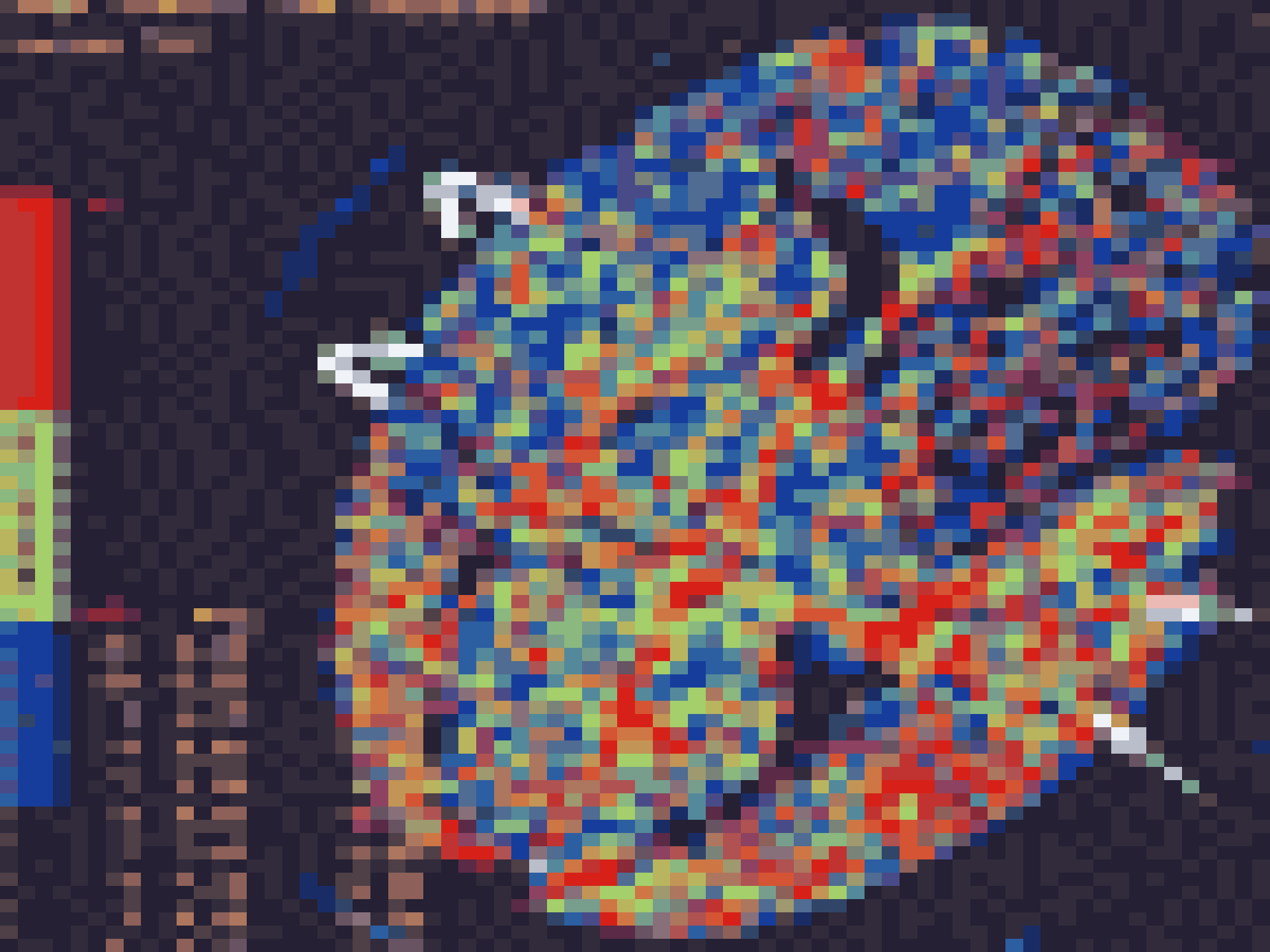
EXTENDING THROMBOLYTIC USE

- Third European Cooperative Acute Stroke Study
- Randomized, placebo controlled study
- 821 patients treated between 3 and 4.5 hours after onset
- 90 day Rankin score of 1 or less: 52.5% tPA and 45% placebo
- Greater ICH but less mortality vs. placebo
- Now recommended by ASA, but not yet FDA approved

CT PERFUSION SCAN

- Serial CT scans acquired rapidly to dynamically track a bolus of contrast as it travels through the brain circulation
- Various parameters can be measured or calculated (e.g. CBF, CBV, MTT, and TTP
- CBF or MTT may indicate "at risk" tissue; CBV may represent irreversibly damaged brain tissue
- The larger the ratio of CBF/CBV, the greater the size of tissue that could be salvaged with reperfusion
- Thus, CT perfusion may allow for treatment at windows greater than 3 hours or prevent use in cases with little salvageable tissue
- Advantage over MRI is speed and cost





TELEMEDICINE

- Increases "comfort level" of ER MD for using tPA
- More direct neurology coverage of rural or underserved areas
  - Larger geographic region
  - Continuous availability
- More rapid evaluation of patient by neurologist
- Better information for the neurologist to use to make decision
  - See patient
  - See imaging study

TELEMEDICINE (CONT.)

- Fort Wayne, IN
- Cooperation between Lutheran and Parkview hospitals
- Links to several smaller hospitals in the area
- Staffing by the neurology group in Fort Wayne
- Option to maintain patient of transfer to larger facility

TELEMEDICINE (CONT.)

- Indiana Rural Health Association
  - Grant from federal government
  - 7 rural hospitals
  - Yet to determine the base provider
- Lugar Center for Rural Health in Terre Haute
  - Self funded
  - 4 rural hospitals
  - They will be the base provider

STROKE SYSTEMS

- Enables the provision of evidence-based care to all patients with CVA
- Provides neurologic coverage for underserved areas
- Coordinated emergency response call centers
- Predetermined interhospital protocols and transfer agreements available
- Availability of neurologic consultation in ER (at least by phone)

STROKE SYSTEMS (CONT.)

- M.D. should be aware of their primary hospitals capabilities for managing CVA
- M.D. should be familiar with a hospital that is comfortable managing acute stroke.
- M.D. should encourage primary hospital to have protocols to expedite CVA management
- M.D, should be able to identify signs and symptoms of CVA
- M.D. should have office protocol for the disposition of patient that presents with a potential CVA
- M.D. should have established communication patterns for hospitals and neurology consultation

REHABILITATION

- Mechanical intervention
- Global support

MECHANICAL INTERVENTION

- Bioness
- Neuroprosthesis for the treatment of limb paralysis
- Provides electrical stimulation of peripheral nerves to operate specific muscle groups
- Facilitates specific movements to allow typical ADL's: walking, grasping

MECHANICAL INTERVENTION (CONT.)

- Muscle re-education
- Minimization of disuse atrophy
- Maintenance of joint range of motion
- Improve local blood circulation
- Reduction of muscle spasm

GLOBAL SUPPORT

- Peer mentoring
  - Stroke survivors interact with stroke patients and their families
  - Sharegivers program from American Stroke Association
    - Trains volunteers about stroke and how to listen
- Post rehabilitation resources
  - From the Indiana Stroke Prevention Task Force
  - Provides information about contacts and programs that can provide assistance for everyday problems.

CONCLUSIONS

- Stroke is a BIG DEAL
- Current management is helpful, but we can always do better
- Treatment needs to start with prevention
- The effects of acute CVA can be minimized
- Rehabilitation can make a difference
- Primary care medicine is important in all phases of CVA management